Federal Communications Commission

Flexibility for Mobile Satellite Service Providers
Ancillary Terrestrial Component
IB Docket No. 01-185

April 25, 2002

Globalstar

Globalstar System

- Operating service links in the Big LEO L/S Bands (1610-1621.35/2483.5-2500 MHz)
  - Licensed to launch and operate in the 2 GHz Band
- 25 Gateways in commercial service
- 1 Gateway fully functional awaiting operating license (Delareyville, South Africa)
- Preparing to ship second Gateway to China
- 11 Gateways in storage in Long Beach, California
  - Two committed to gateway expansions
  - Nine remain uncommitted

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Globalstar System

- Space Segment
  - 48 Satellite constellation
  - 2 In-orbit spare satellites (held at lower altitude pending need)
  - 10-Year life predicted
- Ground Segment
  - 26 Service provider owned and operated gateways
  - 6 Worldwide satellite telemetry ground stations integrally incorporated into gateway network (5 currently operating)
  - 2 Globalstar owned and operated Control Centers in California
- Global Data Network managed by CACI/Infonet

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Total Usage by Terminal Type
(Minutes in 000s)

	2001				
Terminal Type	Q1	Q2	Q3	Q4	Total
Mobile[1/]	3,368	4,195	5,662	4,869	18,094
Fixed	509	1,012	1,734	1,913	5,169
Data Modem	167	179	34	54	435
Aviation				164	164
Total	4,045	5,386	7,431	7,001	23,862
Period over period % growth	53%	33%	38%	-6%	261%
Period daily average	44.9	59.2	82.6	76.1	65.4

[1/] Mobile = Mobile+Carkit+Marine usage

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Restructuring Status

- Chapter 11 Petition filed February 15, 2002 in Delaware
  - Includes consensual restructuring plan with principal creditors
  - Not a liquidation!
- Operating as debtor-in-possession
  - Service continues as before
  - Bare-bones operating expense budget
- Implementing business consolidation strategy
  - Includes the “roll up” of certain service provider gateways
- Soliciting additional investment
  - **ATC authority is key to increasing value of system, attracting investment**

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Restructuring Status

- First consolidation transaction: the purchase of Vodafone's assets in North America, signed December 18, 2001
  - Five associated applications placed on Public Notice on February 27, 2002
- Globalstar, through a subsidiary, will replace Vodafone Satellite Services as the MSS service provider in North America

Restructuring Status

- Economic recession for two years has depressed all telecom business and reduced Globalstar's revenue
- Assets are underutilized
- ATC authority kick-starts New Globalstar's business as economy recovers from recession

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ATC Authority is in the Public Interest

- ATC significantly improves spectrum utilization
- ATC significantly improves the economics of MSS operation
  - Broadens base of potential subscribers
  - Induces more usage, improving average revenue per unit in service
  - Jump-starts new product development
- ATC provides a reliable, ubiquitous, primary or back-up public safety and emergency response system

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ATC authority cannot be separated from MSS license

- Partial severance of Globalstar's L/S Band spectrum would create a new, unaffiliated terrestrial service, and thereby ignore the essential rationale for ATC
- Reduction in L/S Band spectrum for MSS would
  - Force costly redesign of system software
  - Require modification of existing Globalstar handsets
  - Reduce system capacity, perhaps ruinously
  - Limit introduction of new MSS services, such as aircraft monitoring

(continued)

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ATC authority cannot be separated from MSS license

- Keep cost of service high, subscriber base and income low
- Decrease financing for replacement/next generation system due to less income
- Compromise Globalstar's existing ability to avoid interference to/coordinate with Radioastronomy, GPS, GLONASS, ITFS, others
  - CDMA MSS operators require all of the licensed spectrum in order to coordinate with these services
- Preclude multiple CDMA MSS systems in L/S Band

ATC authority cannot be separated from MSS license

- ATC by separate licensee could not be implemented in near term, and delay would not serve the public interest
  - If not available exclusively to current MSS licensees, then not “ancillary”
  - New spectrum allocation rulemaking proceedings
  - New sources of in-band and out-of-band interference where interference is managed today
  - Litigation

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ATC authority cannot be separated from MSS license

- Separate MSS/ATC operations are not technically feasible
  - No way to re-use channels in two separate systems
  - No reasonable way to manage interference between ATC and MSS systems
  - No equitable way to assign channels dynamically to different systems
  - Creates host of operational support systems problems for numbering, billing, roaming, etc.
- Two CDMA MSS licensees can effectively coordinate MSS and ATC systems in shared L/S Band

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Single CDMA operator can manage MSS/ATC shared bandwidth

- Forward band sharing works with Globalstar's current satellites and network
  - Satellite downlinks do not interfere with base station transmissions
  - ATC base station will interfere with MSS user within base station coverage
    - Unless MSS mode uses different frequency
    - But, no interference when MSS user is outside ATC coverage
  - ATC terminal transmissions will degrade satellite capacity
    - This is manageable with MSS and ATC frequency assignment control

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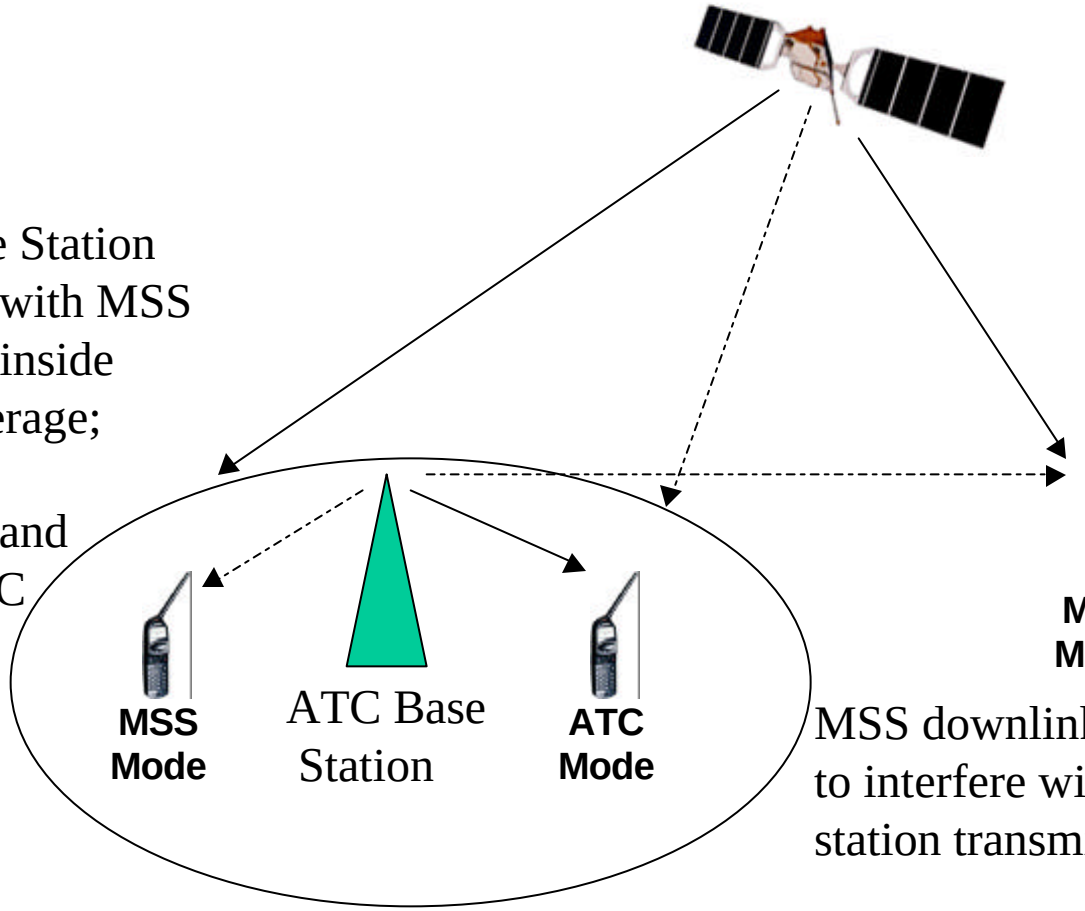
Single CDMA operator can manage MSS/ATC shared downlink bandwidth

ATC Base Station interferes with MSS downlink inside ATC coverage; MSS uses separate band inside ATC coverage



No interference when MSS terminal outside of ATC Coverage; MSS can use whole downlink

MSS downlink too weak to interfere with ATC base station transmissions

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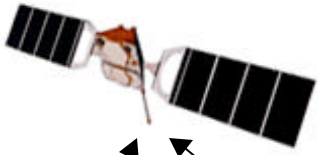
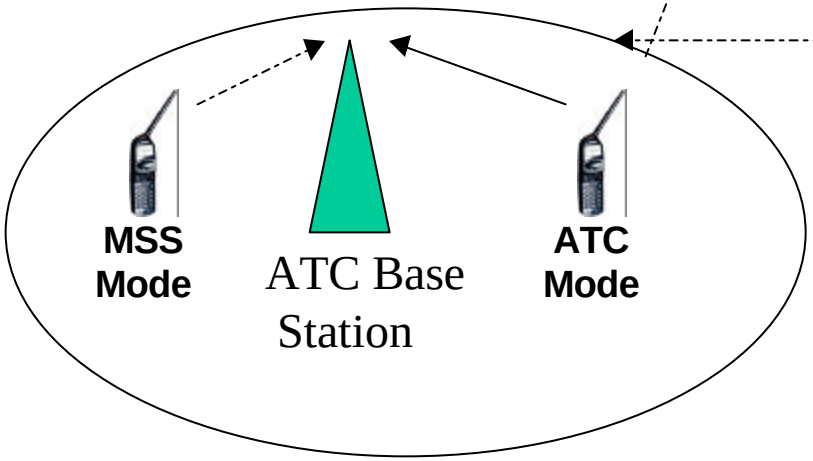
Single CDMA operator can manage MSS/ATC shared uplink bandwidth

ATC could interfere with MSS terminal transmissions;
ATC terminal transmits less power and frequency assignment allows operation



MSS terminal could interfere with ATC terminal transmissions; MSS uses separate band inside ATC coverage



No interference when MSS terminal outside of ATC Coverage; MSS can use whole uplink

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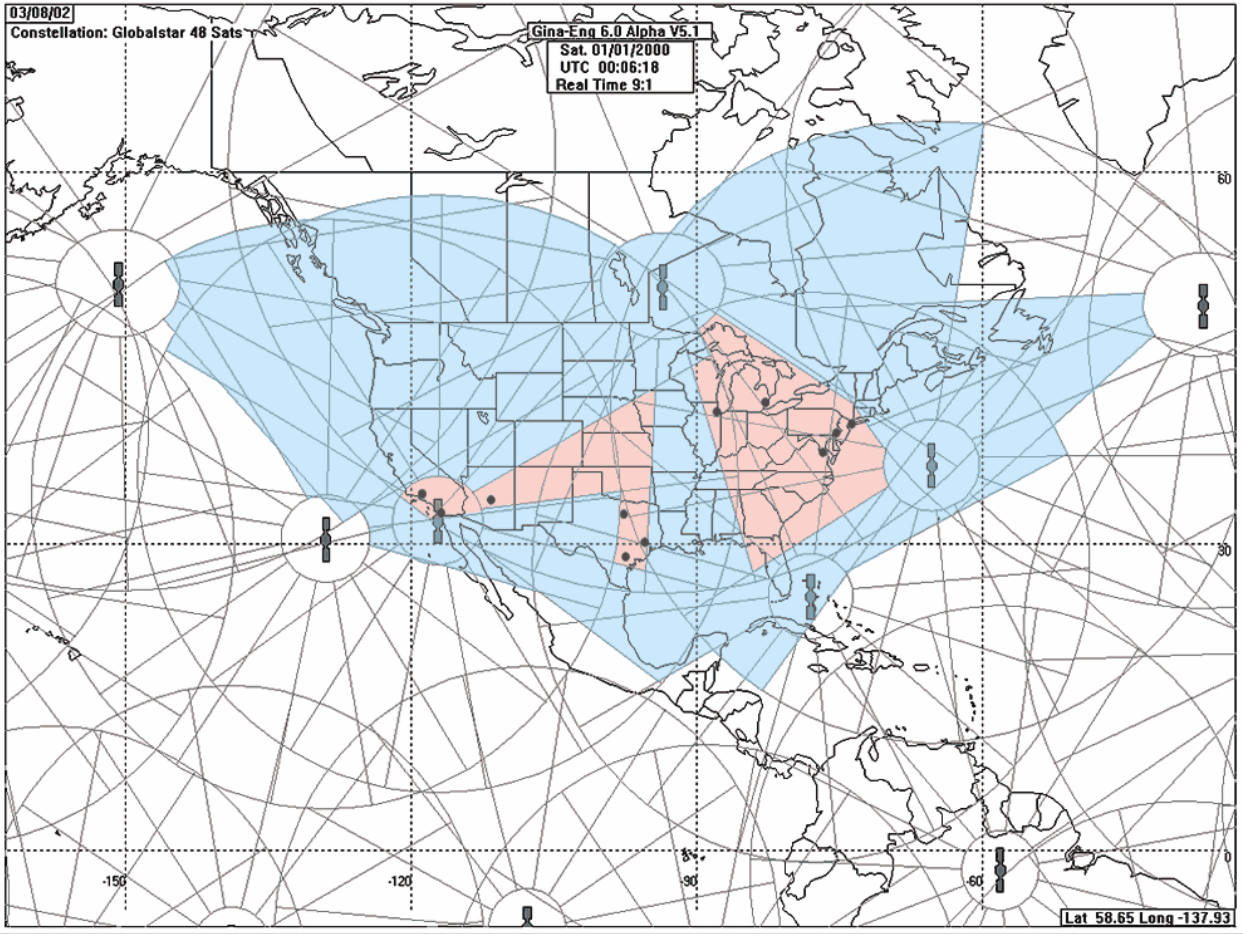
Single CDMA operator can manage MSS/ATC shared bandwidth

- By allowing MSS operator to integrate ATC and share bandwidth, frequency re-use and capacity is increased by 50% relative to band split between ATC and MSS
  - Improvement is between 55% and 58% by beam count based on following examples
  - MSS operator has to dynamically control frequency assignments in order to achieve this efficiency

ATC Frequency Interference Zones Example A

- 10 most populous cities + DC assumed to have ATC services
- Blue zones show normal full-spectrum MSS beams
- Pink zones show regions where worst case ATC frequency interference causes lack of MSS service in ATC frequencies



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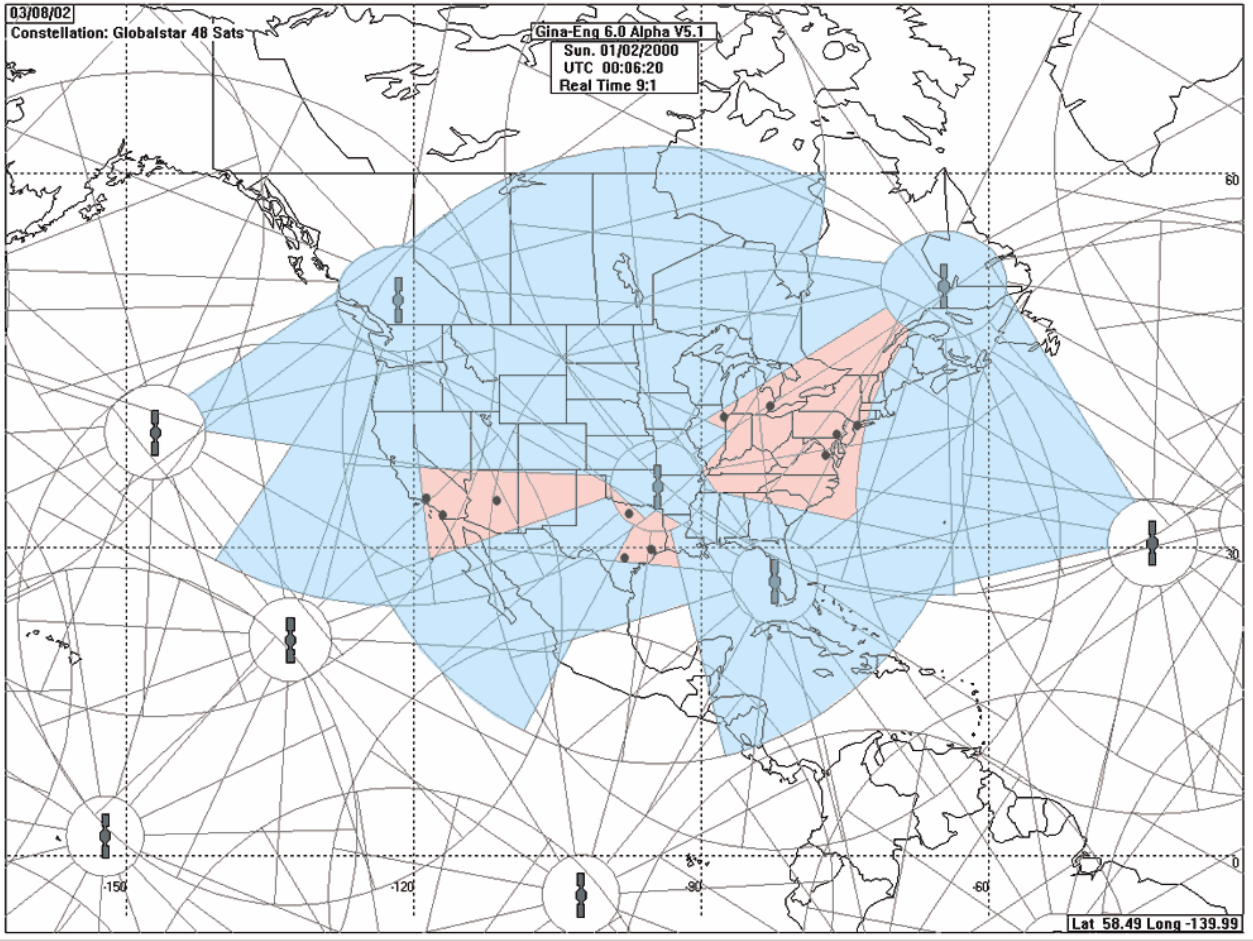
ATC Frequency Interference Zones Example B

- Same as Example “A” except one day later to show dynamics of ATC interference zones



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Efficiency gained from single MSS/ATC system operator

- Additional frequency re-use is achieved when the MSS operator can dynamically assign MSS and ATC frequencies together
  - Up to another 50 % re-use
  - Frequency assignment algorithms exist that create these efficiencies
- Quality of service also improves with single MSS/ATC operator

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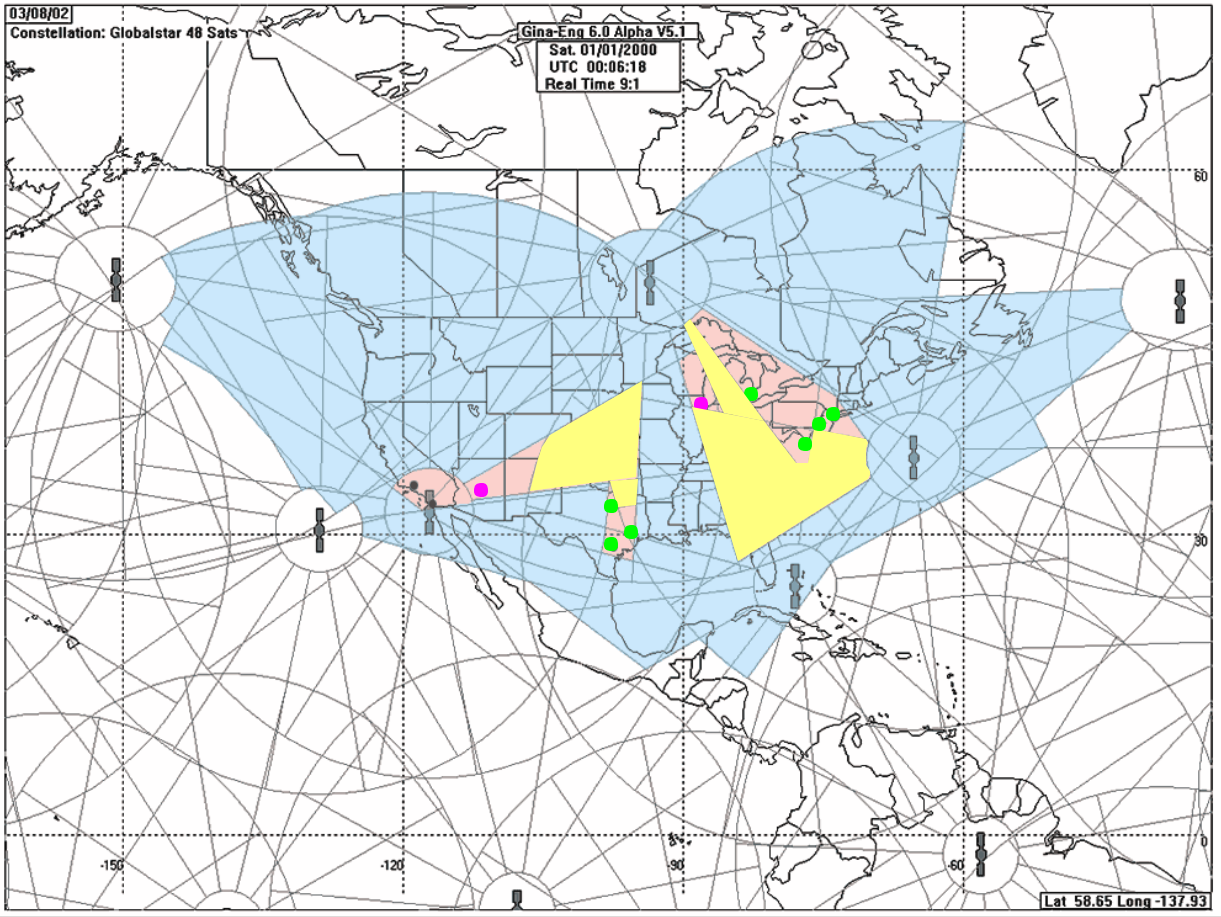
Dynamic Frequency Assignments Example A

- Yellow zones show improvement in MSS service area by assigning two separate frequencies dynamically to MSS and ATC segments
- Yellow zones have all MSS frequencies via select satellites
- Separate ATC frequencies designated by purple and green dots
- Shows 50% more re-use



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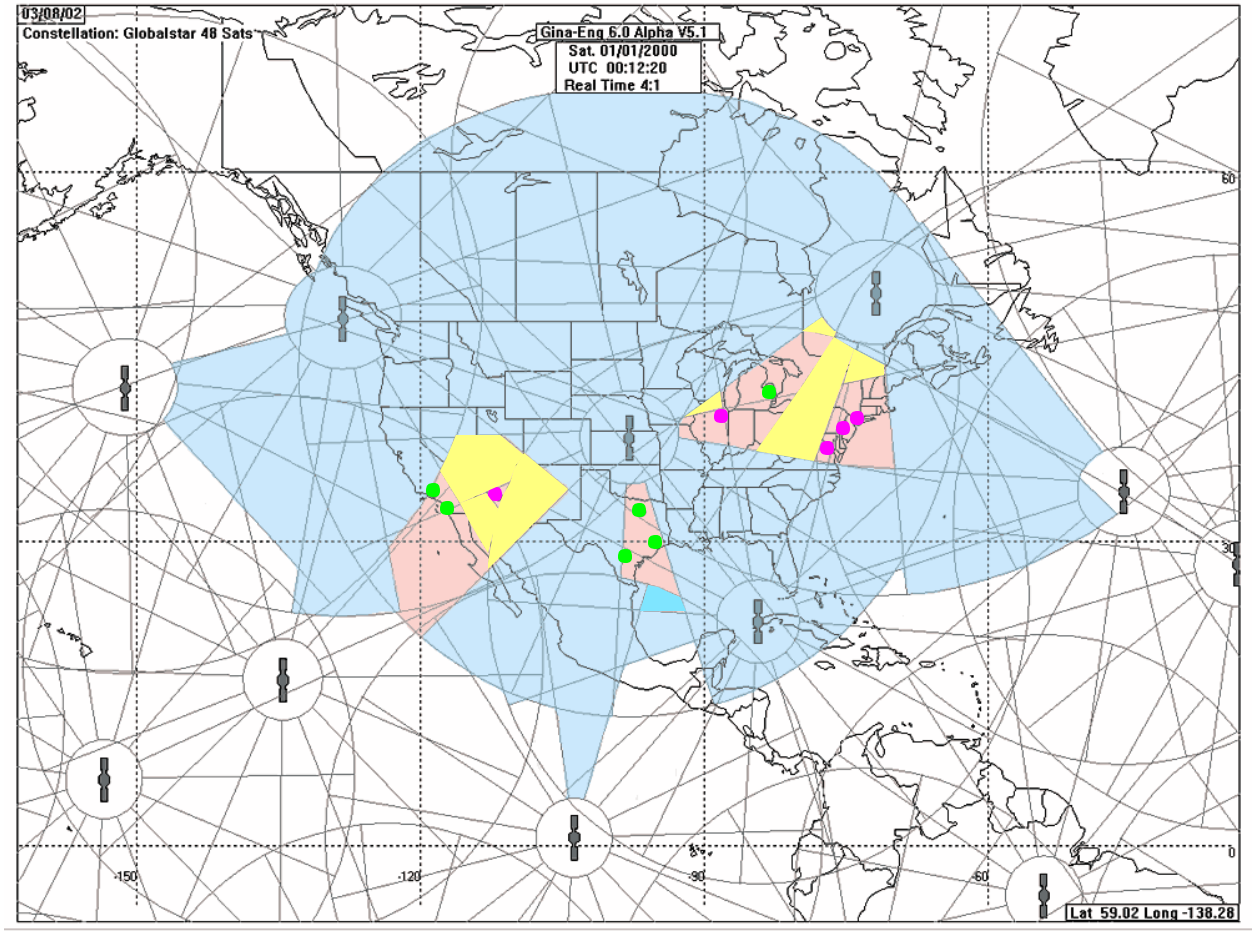
Dynamic Frequency Assignments Example B

- Same as Example “A” except six minutes later to show dynamics of ATC interference zones and required frequency coordination between MSS and ATC segments



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Big LEO Spectrum can be shared by CDMA MSS/ATC operators

- CDMA MSS shares full spectrum in accordance with FCC rules and ITU Radio Regulations
- Operators coordinate separate ATC spectrum
  - Operators can offer ATC in the same locations
- Operators can reserve some spectrum for MSS only
  - Allows for service to MSS only terminals in ATC service areas

Big LEO Spectrum can be shared by CDMA MSS/ATC operators

- MSS downlink shared by coordinating system PFD limit
- ATC downlink and uplink shared by coordinating separate spectrum per area
- MSS uplink shared by aggregate EIRP limits
  - Limits apply to both MSS and ATC terminals
  - Value of aggregate EIRP is higher in the bandwidth in which operator uses ATC
  - Lower value in MSS part of band

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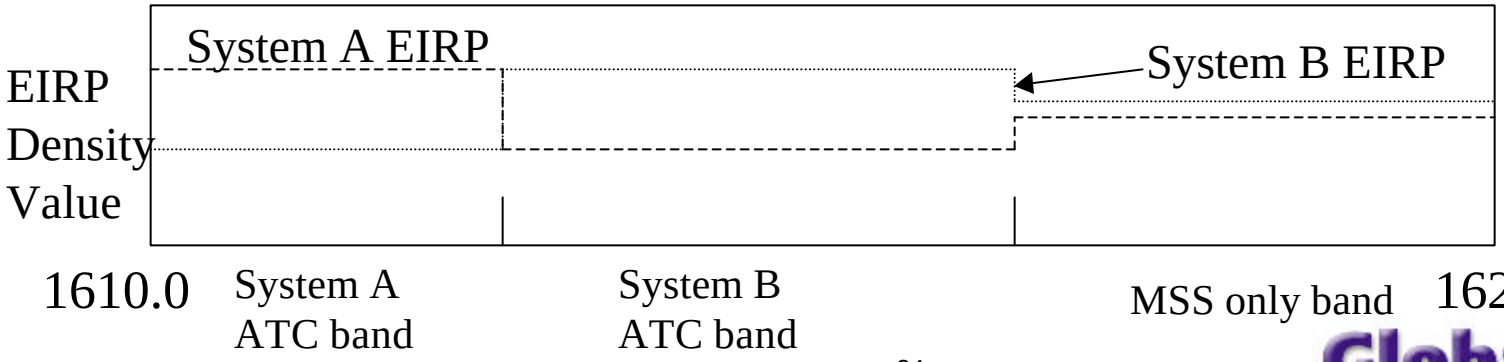
MSS/ATC Operator to MSS/ATC Operator Spectrum Coordination

- Downlink

MSS operations share the whole band by coordinating downlink spectral power flux density limits
ATC operations split the band per small geographical area (city size)

2483.5 2500.0

- Uplink is shared by setting aggregate uplink EIRP spectral density - MSS over whole band, ATC split



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Interference Considerations

- Part 25/GMPCS Big LEO technical rules fully protect other in-band and out-of-band licensees
- ATC operated by MSS licensee causes no additional in-band interference
  - ATC Radio Astronomy interference would be limited in accordance with existing coordination agreement which uses exclusion zones and power limits
  - ATC Base Station placement will be done in coordination with existing Fixed Service installations

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Interference Considerations

- ATC operated by MSS licensee causes no additional out-of-band interference
  - ATC terminals will have the same OOB specifications as Globalstar's MSS terminals
    - Interference to GPS and GLONASS will be limited according to FCC proposed rules
    - Interference to Iridium will be limited according to ITU recommendations
  - ATC base stations will not interfere with ITFS or MMDS if operated below 2498.0 MHz
    - Base stations operating above 2498.0 MHz will be placed in coordination with nearby ITFS and MMDS stations

2 GHz MSS vs. Big LEO MSS

- Exactly the same technical considerations apply
  - Dynamic channel assignment
  - Control of interference
  - Efficient utilization of bandwidth
  - Maximizing number of subscribers within licensed bandwidth
  - Better quality of service in metropolitan areas

2 GHz MSS vs. Big LEO MSS

- Grant of ATC authority to L/S Band MSS would
  - Boost an important, struggling industry
  - Result in exciting new options for consumers
  - Allow MSS to meet emerging public safety and emergency services requirements
  - Maximize public benefit by increasing potential subscribers and reusing existing spectrum

Summary

- ATC authority is valuable to MSS licensees and to consumers. It should be implemented expeditiously.
- It is not technically feasible for a MSS system and a separately-operated ATC to co-exist in a single spectrum band.
- At least two CDMA MSS operators can share the Big LEO spectrum and provide ATC.

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